WHAT IS CLAIMED IS:

1. A method for determining compensation coefficients for accelerometers, said method comprising:

estimating bias accumulation from measured accelerometer outputs;

determining a corrected accelerometer output; and

determining the compensation coefficients using the corrected accelerometer output.

2. A method according to Claim 1 wherein estimating bias accumulation comprises limiting high acceleration testing dwell cycles to about five seconds, where high acceleration is greater than 1g.

3. A method according to Claim 2 further comprising operating the accelerometers at a load of between -1g and +1g for at least five minutes between high acceleration testing dwell cycles.

4. A method according to Claim 1 wherein estimating bias accumulation comprises:

measuring an accelerometer output at a center point of time of a high acceleration load interval, where high acceleration is greater than 1g; and

determining the bias accumulation at the center point of time of the high acceleration interval.

5. A method according to Claim 4 wherein determining the bias accumulation comprises:

measuring accelerometer output at a time prior to a beginning of the high acceleration interval;

measuring accelerometer output at a time after an end of the high acceleration interval;

(Claim 5 continued)

subtracting accelerometer output from the time prior to the beginning of the high acceleration interval from accelerometer output at the time after the end of the high acceleration interval; and

multiplying the difference in the measured accelerometer outputs by one half.

6. A method according to Claim 5 wherein determining a corrected accelerometer output comprises subtracting the multiplied difference from the measured accelerometer output.

7. A method according to Claim 5 wherein the time prior to the beginning of the high acceleration interval and the time after the end of the high acceleration interval are determined using a second derivative of the measured accelerometer output.

8. A method according to Claim 1 wherein estimating bias accumulation comprises estimating bias accumulation at a center point of time, $a_c$, of a high acceleration load interval according to $\frac{1}{2}(a(t_2) - a(t_1))$, where $a(t_1)$ is measured accelerometer output at a time prior to a beginning of the high acceleration load interval, and $a(t_2)$ is measured accelerometer output at a time after an end of the high acceleration load interval, where high acceleration is greater than 1g.

9. A method according to Claim 8 wherein determining a corrected accelerometer output comprises:

measuring accelerometer output at the center point of time; and

correcting accelerometer output according to

$a_c = a(t_c) - \frac{1}{2}(a(t_2) - a(t_1))$, where $a(t_c)$ is measured accelerometer output at the center point of time.

10. A method according to Claim 9 wherein determining compensation coefficients comprises calculating calibration coefficients based on accelerometer testing according to

$$\left(\frac{r_{p/n} \pm dr_{error}}{r_{p/n}}\right) dv_{load} = \left(w_0 + w_1 T + a_c\left(w_2 + w_3 T + w_4 T^2 + w_5 T^3\right) + w_6 a_c^2\right),$$ where $dv_{load}$ is a change in velocity for an applied load and approximate radius arm $r_{p/n}$, $a_c$ is corrected accelerometer output, $T$ is temperature, $r_{p/n}$ is an approximate radius arm for positive g (p) and negative g (n) orientations, $dr_{error}$ is an accelerometer sensing element radial error, and $w_i$ are calibration coefficients.

11. A method according to Claim 10 further comprising

testing accelerometers at multiple temperatures and multiple loads; and

determining $dr_{error}$ and $w_i$ calibration coefficients using testing results which include and $dv_{load}$, $a_c$, and $T$ from each accelerometer test.

12. A method according to Claim 11 further comprising compensating for temperature and accelerometer output error according to

$$dv_{load} = \left(w_0 + w_1 T + dv_{out}\left(w_2 + w_3 T + w_4 T^2 + w_5 T^3\right) + w_6 dv_{out}^2\right),$$ using the values calculated for $w_i$ to minimize errors, where $dv_{out}$ *is the accelerometer output.*

13. A method for compensating for bias instabilities in accelerometers comprising:

removing temperature cycle hysteresis through temperature cycling;

limiting durations of high acceleration load dwell times, wherein high acceleration is an acceleration of more than 1g; and

determining a corrected accelerometer output to compensate for bias accumulated during the high acceleration load dwell times.

14. A method according to Claim 13 wherein limiting durations of high acceleration load dwell times comprises operating the accelerometers at a load of between -1g and +1g for at least five minutes between high acceleration testing dwell cycles.

15. A method according to Claim 13 wherein determining a corrected accelerometer output comprises:

measuring an accelerometer output at a center point of time of a high acceleration load dwell; and

estimating the bias accumulation at the center point of time of the high acceleration load dwell.

16. A method according to Claim 15 wherein estimating the bias accumulation comprises:

subtracting accelerometer output at a time prior to a beginning of the high acceleration interval from accelerometer output at a time after an end of the high acceleration interval;

multiplying the difference in accelerometer outputs by one half; and

subtracting the multiplied difference from the measured accelerometer output at the center point of time.

17. A method according to Claim 16 wherein the time prior to the beginning of the high acceleration interval and the time after the end of the high acceleration interval are determined using a second derivative of the measured accelerometer output.

18. A method of removing bias accumulation from an accelerometer measured output, the output being measured at a center point of time of a high acceleration load interval, high acceleration being a load of more than 1g, said method comprising:

(Claim 18 continued)

estimating bias accumulation at the center point of time, $t_c$, according to $\frac{1}{2}(a(t_2) - a(t_1))$, where $a(t_1)$ is measured accelerometer output for a 1g load at a time prior to a beginning of the high acceleration load interval, and $a(t_2)$ is measured accelerometer output for a 1g load at a time after an end of the high acceleration load interval; and

correcting accelerometer output according to $a_c = a(t_c) - \frac{1}{2}(a(t_2) - a(t_1))$, where $a(t_c)$ is measured accelerometer output at the center point of time.

19. A system configured to determine compensation coefficients for an accelerometer, said system comprising:

a computer comprising a processor and a memory;

a rate table comprising a chamber;

a rate table controller connected to said computer and configured to run acceleration load profiles on said rate table, the acceleration load profiles stored in said memory of said computer;

a temperature controller connected to said computer and configured to run temperature profiles in said chamber, the temperature profiles stored in said memory of said computer; and

a device configured to measure output of said accelerometer, said device, said computer configured to receive and store output data from said device, said computer configured to estimate bias accumulation from measured accelerometer outputs, determine corrected accelerometer outputs, and determine compensation coefficients using the corrected accelerometer outputs.

20. A system according to Claim 19 wherein said computer is configured to limit high acceleration testing dwell cycles for accelerometers to about five seconds, where high acceleration is greater than 1g.

21. A system according to Claim 19 wherein said computer is configured to operate the accelerometers at a load of between -1g and +1g for at least five minutes between high acceleration testing dwell cycles.

22. A system according to Claim 19 wherein said computer is configured to:

measure an accelerometer output at a center point of time of a high acceleration load interval, where high acceleration is greater than 1g; and

determine the bias accumulation at the center point of time of the high acceleration load interval.

23. A system according to Claim 22 wherein said computer is configured to:

measure accelerometer output at a time prior to a beginning of the high acceleration load interval;

measure accelerometer output at a time after an end of the high acceleration load interval;

subtract measured accelerometer output at the time prior to the beginning of the high acceleration interval from measured accelerometer output at the time after the end of the high acceleration interval;

multiply the difference in accelerometer measured outputs by one half; and

subtract the multiplied difference from the measured accelerometer output at the center point of time of the high acceleration load interval.

24. A system according to Claim 22 wherein said computer is configured to determine the time prior to the beginning of the high acceleration interval and the time after the end of the high acceleration interval using a second derivative of measured accelerometer output.

25. A system according to Claim 22 wherein said computer is configured to estimate bias accumulation at a center point of time, $a_c$, of a high acceleration load interval according to $\frac{1}{2}(a(t_2)-a(t_1))$, where $a(t_1)$ is measured accelerometer output at a time prior to a beginning of the high acceleration load interval, and $a(t_2)$ is measured accelerometer output at a time after an end of the high acceleration load interval, where high acceleration is greater than 1g.

26. A system according to Claim 25 wherein said computer is configured to:

measure accelerometer output at the center point of time; and

correct accelerometer output according to $a_c = a(t_c)-\frac{1}{2}(a(t_2)-a(t_1))$,

where $a(t_c)$ is measured accelerometer output at the center point of time.

27. A system according to Claim 26 wherein said computer is configured to calculate calibration coefficients based on accelerometer testing according to $\left(\frac{r_{p/n} \pm dr_{error}}{r_{p/n}}\right)dv_{load} = \left(w_0 + w_1 T + a_c\left(w_2 + w_3 T + w_4 T^2 + w_5 T^3\right) + w_6 a_c^2\right)$, where $dv_{load}$ is a change in velocity for an applied load and approximate radius arm $r_{p/n}$, $a_c$ is corrected accelerometer output, $T$ is temperature, $dr_{error}$ is an accelerometer sensing element radial error to be determined using test results, and $w_i$ are calibration coefficients to be determined using test results using specific $dv_{load}$, $a_c$, and $T$ from each test.

28. A computer for removing bias accumulation from accelerometer measured outputs, the outputs being measured at a center point of time of a high acceleration load interval, high acceleration being a load of more than 1g, said computer configured to:

(Claim 28 continued)

estimate bias accumulation at the center point of time, $t_c$, according to $\frac{1}{2}(a(t_2)-a(t_1))$, where $a(t_1)$ is measured accelerometer output at a time prior to a beginning of the high acceleration load interval, and $a(t_2)$ is measured accelerometer output at a time after an end of the high acceleration load interval; and

correct accelerometer output according to $a_c = a(t_c) - \frac{1}{2}(a(t_2)-a(t_1))$, where $a(t_c)$ is measured accelerometer output at the center point of time.